REMARKS

The Office Action dated January 8, 2008 has been received and carefully noted. The following remarks are submitted as a full and complete response thereto.

Applicants respectfully submit that no new matter has been added and no new issues are raised which require further consideration or search. Therefore, claims 1-8 are currently pending in the application and are respectfully submitted for consideration.

The Office Action rejected claim 7 under 35 U.S.C. §101 as allegedly being directed to non-statutory subject matter. Specifically, the Office Action indicated that claim 7 claims a computer program, and alleged that a computer program is not a physical object, and therefore is non-statutory. In contrast, the Office Action alleged, a physical computer readable medium is statutory since it is a physical object. This rejection is respectfully traversed for at least the following reasons.

In the "Response to Amendments" section, the Office Action alleged that claim 7 recites a non-physical object. The Office Action further suggested that the claim should read "a computer readable medium encoded with a computer program, which when executed performs..." The Office Action distinguished between a physical computer readable medium and a software program, stating that because a computer readable medium is a physical object, it is statutory, and because a software program is not a physical object, it is non-statutory. (see Office Action at page 4).

Claim 7 recites "[a] computer program <u>embodied on a computer readable medium</u> ... the computer program being configured <u>to control a processor</u>...." Thus, contrary to

the Office Action's position, claim 7 is not directed toward a computer program; instead, it is directed toward a computer program embodied on a computer readable medium. In rejecting claim 7, the Office Action appears to be emphasizing form over substance. Specifically, the Office Action appears to be taking the position that "computer readable medium encoded with a computer program," is statutory, where "computer program embodied on a computer readable medium," is somehow non-statutory, even though both phrases are directed toward the same concept: functional descriptive material tangibly embodied on a computer readable medium. Applicants respectfully submit that the Office Action's emphasis on form over substance is not supported by U.S. patent law, or USPTO procedure, under the MPEP.

MPEP § 2106.01 defines "functional descriptive material" as "data structures and computer programs which impart functionality when employed as a computer component." Furthermore, MPEP § 2106 states that "when functional descriptive material is recorded on some computer-readable medium, it becomes structurally and functionally interrelated to the medium and will be statutory...." (See MPEP § 2106.01 – Computer-Related Nonstatuory Subject Matter). It is important to note that the MPEP does not require a specific format for a claim directed toward a computer program recorded on a computer readable medium. Instead, the MPEP merely require that the claim not be directed towards a computer listing per se, but instead, the claim must be directed toward a computer element which defines a structural and functional interrelationship between the computer program and the rest of the computer which

permit the computer program's functionality to be realized. Applicants respectfully submit that "a computer program embodied on a computer readable medium … the computer program being configured to control a processor to perform," identifies the required structural and functional interrelationship between the computer program and the rest of the computer, to distinguish the claim from a computer program per se, and thus, claim 7 recites patentable subject matter. Accordingly, Applicants respectfully request reconsideration, and request that this rejection be withdrawn.

The Office Action rejected claims 1-2 and 4-8 under 35 U.S.C § 103(a) as allegedly being unpatentable over Kondylis et al. (U.S. Patent No. 6,621,805) ("Kondylis"), in view of Cousins (U.S. Patent No. 6,618,385) ("Cousins"), in further view of Galand et al. (U.S. Patent No. 6,628,670) ("Galand"). The Office Action took the position that Kondylis discloses all the elements of the claims with the exception of certain elements. The Office Action then cited Cousins and Galand as allegedly curing the deficiencies of Kondylis. The rejection is respectfully traversed for at least the following reasons.

Claim 1, upon which claims 2-5 are dependent, recites a method of allocating bandwidth in a first node that is operable in an ad hoc, wireless network configured to support at least one guaranteed feasible flow allocation. The method includes the steps of initiating a communication between the first node and a second node in the network that, together, are endpoints of a link, the communication being related to possible bandwidth allocation adjustment of a flow sharing the link, and determining, in the first node, a first

new bandwidth allocation that approaches a first optimization condition for the flow. The method further includes the steps of communicating with the second node to determine a mutually-agreed upon optimal bandwidth allocation for the flow, and notifying neighbor nodes in the network of the mutually-agreed upon optimal bandwidth allocation when reallocation is needed. The method further includes the steps of adopting the mutually-agreed upon optimal allocation for the flow when reallocation is needed.

Claim 6 recites a network device configured to allocate bandwidth in an ad hoc, wireless network configured to support at least one guaranteed feasible flow allocation. The device includes a first communication unit configured to initiate a communication between the device and a node in the network that, together, are endpoints of a link in the network, the communication being related to possible bandwidth allocation adjustment of a flow sharing the link, and a first processing unit configured to determine a first new bandwidth allocation that approaches a first optimization condition for the flow, wherein the first processing unit is operably connected to the first communication unit. The device further includes a second communication unit configured to communicate with the node to determine a mutually-agreed upon optimal bandwidth allocation for the flow, where the second communication unit is operably connected to the first communication unit, an da third communication unit configured to notify neighbor nodes in the network of the mutually-agreed upon optimal bandwidth allocation when reallocation is needed, where the third communication unit is operably connected to the first communication unit. The device further includes a second processing unit configured to adopt the

mutually-agreed upon optimal allocation for the flow when reallocation is needed, wherein the second processing unit is operably connected to the first communication unit.

Claim 7 recites a computer program embodied on a computer readable medium to allocate bandwidth in an ad hoc, wireless network configured to support at least one guaranteed feasible flow allocation. The computer program is configured to control a processor to perform a first sub-routine for initiating a communication between the first node and a second node in the network that, together, are endpoints of a link, the communication being related to possible bandwidth allocation adjustment of a flow sharing the link, and a second sub-routine for determining, in the first node, a first new bandwidth allocation that approaches a first optimization condition for the flow. The computer program is further configured to control a processor to perform a third sub-routine for communicating with the second node to determine a mutually-agreed upon optimal bandwidth allocation for the flow, and a fourth sub-routine for notifying neighbor nodes in the network of the mutually-agreed upon optimal bandwidth allocation when reallocation is needed. The computer program is further configured to control a processor to perform a fifth sub-routine for adopting the mutually-agreed upon optimal allocation for the flow when reallocation is needed.

Claim 8 recites a network device configured to allocate bandwidth in an ad hoc, wireless network configured to support at least one guaranteed feasible flow allocation. The network device includes initiation means for initiating a communication between the

first node and a second node in the network that, together, are endpoints of a link, the communication being related to possible bandwidth allocation adjustment of a flow sharing the link, and determination means for determining, in the first node, a first new bandwidth allocation that approaches a first optimization condition for the flow. The network device further includes determination means for communicating with the second node to determine a mutually-agreed upon optimal bandwidth allocation for the flow, and notification means for notifying neighbor nodes in the network of the mutually-agreed upon optimal bandwidth allocation when reallocation is needed. The network device further includes adoption means for adopting the mutually-agreed upon optimal allocation for the flow when reallocation is needed.

An implementation of the current invention provides a configuration of a multi-hop wireless ad hoc network that operates with a network schedule of period T time slots. At each slot of this schedule a set of non-interfering links are scheduled to transmit simultaneously. The number of such conflict-free time slots each link receives within the period T determines its allocated bandwidth.

The network schedule is realized by local schedules of T-slots at the wireless nodes. The local schedule of each node may include T slots. Each time slot tells the node which channel and link this node should transmit or receive. In order for successful communication to occur on a link at a particular slot, the local schedules of the endpoint nodes should be such that one node starts transmitting and the other node starts receiving on this particular slot at the same time and channel.

Embodiments of the present invention solve the problem of realizing a globally optimal bandwidth allocation on all links in the network through an incremental algorithm where nodes may start from an initial schedule (realizing a sub-optimal bandwidth allocation) and locally readjust the bandwidth on their adjacent links through time slot reassignments until the nodes reach a global time-slotted schedule that realizes a globally optimal allocation for all links in the wireless ad hoc network.

Each link is asynchronously activated for bandwidth adjustment at mutually agreed intervals of its endpoint nodes. When a link is activated for bandwidth adjustment, one of the endpoint nodes performs a local computation for a potential allocation of bandwidth to the link. This reallocation may take away bandwidth (time slots) from the adjacent links of this node. This is due to the half-duplex nature of wireless nodes, which requires links adjacent to a node be activated on different slots. A similar local computation is performed at the other endpoint node of the link. Then the two nodes agree on the both the amount of bandwidth (number of slots) and which time slots should be allocated to this link. Then the two node endpoints notify their neighbor nodes on their other adjacent links about how much bandwidth (how many slots) they should deallocate and which slots they should cancel in their own local schedules from these links. This notification step essentially tells the neighbors to reallocate bandwidth on the links they were notified from. The notification step is necessary because two nodes can communicate in a slot only if both are tuned to this slot in their local schedules.

As will be discussed below, the combination of Kondylis, Cousins, and Galand fails to disclose or suggest all of the elements of the claims, and therefore fails to provide the advantages and features discussed above.

Kondylis generally describes a real-time multicast scheduler to avoid packet collisions and to facilitate color re-use, where "color" is defined as a channel selected as a combination of time-division multiple access, frequency-division multiple access, and code division multiple access schemes. (see Kondylis at Abstract).

Cousins generally describes a network initialization process to determine the maximum available data transfer throughput, optimized bandwidth, and optimized transfer conditions in a **wired** network. (See Cousins at col. 3, lines 42-58). Specifically, the network initialization process also negotiates the number of twisted pair wires to use, detects and identifies scrambled wires, determines the compression scheme to use, etc. These parameters are then utilized in a predetermined well known modulation communications technique such as spread spectrum or Quadrature Amplitude Modulation (QAM) to accordingly adjust the data transfer rate between the two devices. Also, the negotiation session of Cousins seeks to establish the data transfer scheme between the two machines (e.g., **how data is transferred over various twisted pair wires**) and to determine the best use of the available bandwidth. Accordingly, part of this negotiation includes the selection of compression algorithms for use in the data transfer. Moreover, the negotiation further includes reservation of part of the bandwidth for isocronous data and/or other non-LAN uses such as streaming video. (see Cousins at col. 7, lines 40-52).

Galand generally describes routing path selection and bandwidth reservation to connections sharing a path in a packet switched ***wireline*** communication network. (see Galand at Abstract). Galand further provides exchanging of information (109) between the origin (access) node (100), the transit nodes (107) on the path, and the destination node (108). (104) Bandwidth Reservation replies from transit nodes and end node generate either a call acceptance or a call reject (110). (105) a Link Metric Update process updates, in case of call acceptance, the modified link metrics. This information (111) is sent through the Control Spanning Tree to the Topology Database of each node in the network by means of a broadcast algorithm. (see Galand at col. 10, line 40 – col. 11, line 2).

Applicants respectfully submit that Kondylis, Cousins, and Galand, whether considered individually or in combination, fail to disclose, teach, or suggest, all of the elements of the present claims. For example, the combination of Kondylis, Cousins, and Galand fails to disclose, teach, or suggest, at least, "*an adhoc, wireless network configured to support at least one guaranteed feasible flow allocation,*" "*initiating a communication between the first node and a second node in the network that, together, are endpoints of a link, the communication being related to possible bandwidth allocation adjustment of a flow sharing the link,*" and "*notifying neighbor nodes in the network of the mutually-agreed upon optimal bandwidth allocation when reallocation is needed,*" as recited in independent claim 1, and similarly recited in independent claims 6-8.

The Office Action dated July 3, 2007 ("Original Office Action") took the position that Kondylis discloses "*an adhoc, wireless network configured to support at least one guaranteed feasible flow allocation*," as recited in independent claim 1, and similarly recited in independent claims 6-8, because Kondylis discloses that "the communication nodes can adapt the reserved bandwidth according to traffic fluctuation," and the Original Office Action interpreted "configured to support at least one guaranteed feasible flow allocation" to read on the adaptation disclosed in Kondylis. In the previous response dated November 5, 2007 ("Previous Response"), <u>inter alia</u>, Applicants persuasively argued that Kondylis fails to disclose, or suggest, *an adhoc, wireless network configured to support at least one guaranteed feasible flow allocation*," as recited in independent claim 1, and similarly recited in independent claims 6-8.

In the "Response to Arguments" section of the current Office Action, the Office Action maintained its position that Kondylis discloses "*an adhoc, wireless network configured to support at least one guaranteed feasible flow allocation*," as recited in independent claim 1, and similarly recited in independent claims 6-8. Specifically, the Office Action supported its initial argument by interpreting "flow allocation" as reading on the reserved bandwidth disclosed in Kondylis, and arguing that "since bandwidth is reserved, it is guaranteed feasible." (see Office Action at page 2). Applicants respectfully disagree for the following reasons.

According to U.S. patent law, and the MPEP, a patent examiner may only give a claim term "[its] broadest reasonable interpretation <u>consistent with the specification</u>."

(MPEP § 2111 – Claims Interpretation; Broadest Reasonable Interpretation; see also *Phillips v. AWH Corp.*, 415 F.3d 1303, 75 USPQ2d 1321 (Fed. Cir. 2005)). For at least the following reasons, Applicants respectfully submit that the Office Action's interpretation of "flow allocation" and "feasible," is not reasonable, given the specification.

The Office Action's interpretation of flow allocation and feasibility is not consistent with the respective definitions in the specification of the present application. In defining feasibility, the specification makes clear that a flow bandwidth allocation is not equivalent to a bandwidth that has already been reserved. Instead, flow bandwidth allocations that are feasible (and can later be reserved) are only those for which there exists a schedule that can realize them by taking into account interference relationships in the adhoc network.

For example, the specification describes that embodiments of the invention may use a fluid model to describe the feasibility of bandwidth allocations in a multi-channel ad hoc network. According to the fluid model, the rate (normalized bandwidth) r_f of a link flow f in a ad hoc network is the <u>fraction of conflict-free slots allocated to flow f in a T-periodic schedule</u>. Furthermore, according to the fluid model, a bandwidth allocation of flows $R = (r1, \ldots, r_f, \ldots r_{F1})$ is called feasible if there exists a <u>conflict-free schedule</u> that allocates to every flow f, a rate equal to r_f. (see Specification at paragraph 0062-0063).

This definition of feasibility and the feasibility conditions discussed in the specification allow embodiments of the invention to capture the interference relationships in wireless networks and also allow embodiments of the invention to realize both QoS objectives where the flow bandwidth allocations are known in advance (e.g. real-time traffic) <u>and fairness objectives when the flow bandwidth allocations are not known in advance</u>.

Kondylis merely addresses adapting a reserved bandwidth according to multicast real-time traffic. Specifically, Kondylis discloses that nodes can continuously estimate a current mean source rate and adapt an amount of reserved bandwidth accordingly. (see Kondylis at col. 6, lines 59-62). Thus, the teaching of Kondylis is limited to the scenario where the bandwidth allocations have already been reserved, and there is no disclosure, or suggestion, of taking into account interference relationships in the adhoc network to determine bandwidth allocations which have not already been reserved.

Thus, Applicants respectfully submit that the Office Action's interpretation of "*an adhoc, wireless network configured to support at least one guaranteed feasible flow allocation*," is unreasonably broad, given the specification. Accordingly, Applicants respectfully submit that Kondylis fails to disclose, or suggest, "*an adhoc, wireless network configured to support at least one guaranteed feasible flow allocation*," as recited in independent claim 1, and similarly recited in independent claims 6-8.

Furthermore, as correctly recognized in the Office Action, Kondylis fails to teach or suggest all the steps recited in the method of independent claim 1, and similarly recited

in independent claims 6-8. Accordingly, the Office Action relied on Cousins and Galand as describing such steps. The Original Office Action took the position, inter alia, that Cousins discloses "*initiating a communication between the first node and a second node in the network that, together, are endpoints of a link, the communication being related to possible bandwidth allocation adjustment of a flow sharing the link,*" as recited in independent claim 1, and similarly recited in independent claims 6-8. In the Previous Response, Applicants persuasively argued, inter alia, that Cousins fails to disclose or suggest, "*initiating a communication between the first node and a second node in the network that, together, are endpoints of a link, the communication being related to possible bandwidth allocation adjustment of a flow sharing the link,*" as recited in independent claim 1, and similarly recited in independent claims 6-8. Rather, Cousins performs a network initialization process prior to the data transfer, and focuses on a determination of a set of optimal transmission parameters for a single link.

In the "Response to Arguments" section of the current Office Action, the Office Action maintained its position that Cousins discloses "*initiating a communication between the first node and a second node in the network that, together, are endpoints of a link, the communication being related to possible bandwidth allocation adjustment of a flow sharing the link,*" as recited in independent claim 1, and similarly recited in independent claims 6-8. Specifically, the Office Action interpreted "flow sharing the link," as reading on the single link disclosed in Cousins, and interpreted "possible bandwidth allocation adjustment" as reading on the network initialization process. (see

Office Action at page 3). Applicants respectfully disagree. For at least the following reasons, Applicants respectfully submit that the Office Action's interpretation of "flow sharing the link" and "possible bandwidth allocation adjustment," is not reasonable, given the specification.

Regarding "flow sharing the link," the specification of the present application makes very clear that a flow is not identical to a link. Specifically, the specification states that a transmission is made up of one or more link flows, <u>which take place simultaneously on different physical links and generally do not interfere with each other</u>. Furthermore, the specification states that <u>a physical link is commonly shared with a number of logical link flows.</u> (see paragraph at 0034). Thus, the specification clearly defines a link as a physical connection between two nodes, whereas a flow is a logical connection between the two nodes which uses a physical link, and where multiple flows may coexist on one physical link.

Cousins merely discloses a negotiation session between a DTE and DCE, where the negotiation session seeks to establish a data transfer scheme between the two machines, and specifically determines the best use of the available bandwidth <u>for that particular physical link</u>. There is no disclosure, or suggestion, of setting up specific configuration parameters for a logical flow which uses the physical link.

Although, the Office Action took the position that "flow sharing the link" is interpreted to read on the single link of Cousins, the Office Action appears to be mindful of the distinction between flow and link. In fact, the Office Action appears to contradict

its own argument that "flow sharing the link" reads on the single link of Cousins. Specifically, the Office Action stated that the cited passage in Cousins indicates the different reservation of bandwidth to be made for different types of data flows, such as "isochronous data and/or other non-LAN uses such as streaming video," as recited in column 7, line 49-52. (see Office Action at page 3). Thus, the Office Action appears to be arguing for the first time that Cousins actually discloses a flow sharing a link, rather than a single link. Applicants disagree with this new position as well. In describing reserving part of the bandwidth for isochronous data, such as streaming video, Cousins still frames the discussion in terms of the physical link. Cousins discloses reserving part of the bandwidth of the physical link for isochronous data. There is no disclosure, or suggestion, of reserving a portion of the bandwidth for a particular flow which shares the link. Thus, Applicants respectfully submit that the Office Action's interpretation of "flow sharing the link," is unreasonably broad, given the specification.

Regarding "possible bandwidth allocation adjustment," the Office Action took the position that "even though Cousins discloses setting optimized parameters prior to setting the connection, the setting of the optimized parameters are still considered 'adjustment' to be made that are adaptive to changing conditions as recited in the abstract." The Office Action further took the position that "the setting of optimized parameters are not necessarily adjustments to be made for existing data flows, however, they are adjustments to be made to the different flows that will be sharing the links, once the connection is set up". (see Office Action at page 3).

Applicants respectfully submit that this interpretation of "adjustment" is not reasonable given the plain meaning of the term, let alone the specification. An initiation of a non-existent configuration parameter is not an "adjustment," as there is no pre-existing parameter to adjust. Thus, Applicants respectfully submit that the Office Action's interpretation of "possible bandwidth allocation adjustment," is also unreasonably broad, given the specification. Accordingly, Applicants respectfully submit that Cousins fails to disclose or suggest, "*initiating a communication between the first node and a second node in the network that, together, are endpoints of a link, the communication being related to possible bandwidth allocation adjustment of a flow sharing the link*," as recited in independent claim 1, and similarly recited in independent claims 6-8.

Furthermore, although not addressed in the Office Action's "Response to Arguments," section, Applicants reiterate that Cousins does not teach or suggest a method for an "*ad hoc wireless network configured to support at least one guaranteed feasible flow allocation*," as recited in independent claim 1, and similarly recited in independent claims 6-8. **Rather, Cousins is for wired local area (LAN) networks instead of wireless ad hoc networks**. In wireless networks links interfere and, hence, bandwidth allocation on one link affects other links.

Furthermore, the Original Office Action correctly concludes that Kondylis and Cousins, whether considered individually or in combination, do not disclose or suggest, "*notifying neighbor nodes in the network of the mutually-agreed upon optimal bandwidth*

allocation when reallocation is needed," as recited in independent claim 1, and similarly recited in independent claims 6-8. The Original Office Action cited Galand as allegedly curing the deficiencies of Kondylis and Cousins.

Applicants respectfully submit that Galand fails to disclose, or suggest, "*notifying neighbor nodes in the network of the mutually-agreed upon optimal bandwidth allocation when reallocation is needed*," as recited in independent claim 1, and similarly recited in independent claims 6-8, for at least the reasons discussed below.

Galand discloses that a connection request is specified by the user via a set of parameters including origin and destination network address, and data flow characteristics. Galand further discloses that a bandwidth reservation process uses the connection request to reserve bandwidth on each of the links of the path, and the bandwidth reservation replies from the transit nodes and the end node generate either a call acceptance or a call reject. Subsequently, a link metric update process, in case of a call acceptance, updates the modified link metrics by sending the information through the Control Spanning Tree to the topology database of each node in the network through a broadcast algorithm. (see Galand at col. 10, lines 59-63).

Galand fails to disclose, or suggest, a <u>mutually-agreed upon optimal bandwidth allocation</u>. Instead, Galand discloses that a bandwidth reservation process reserves bandwidth on each of the links of the path. Neither the user, nor any of the nodes on the links of the path, have a say in what the bandwidth allocation should be. Furthermore, Galand fails to disclose, or suggest, notifying <u>neighbor nodes in the network</u>. Instead,

Galand discloses that all of the nodes in the network are notified of the modified link metric, though a broadcast algorithm. The use of a broadcast algorithm signifies that every node of the network receives the modified link metric. The message is not targeted to merely the neighbor nodes.

In contrast, according to embodiments of the invention, the optimal bandwidth allocation which is sent to the neighbor nodes is a mutually-agreed upon optimal bandwidth allocation. Specifically, according to embodiments of the invention, a first node (i.e. node i) initiates the rate adjustment process by sending an RT_UPD packet to a second node (i.e. node j), where the RT_UPD packet may contain a requested rate adjustment direction (e.g. increase or decrease) and amount (e.g. number of slots). Node j then responds to node i with an RT_UPD packet of its own. Then, based on the exchanged information of the RT_UPD packets, the nodes decide on the direction and the amount of the adjustment. (see Specification at paragraph 0057, steps 1-3). Thus, according to embodiments of the invention, the optimal bandwidth is a mutually-agreed upon optimal bandwidth allocation.

Furthermore, according to embodiments of the invention, after an optimal bandwidth allocation is mutually-agreed upon by nodes A and B, both nodes A and B, and their possible affected neighbors have updated their local schedules to flow f. (see Specification at paragraph 0057, step 11). The specification further discloses that, according to embodiments of the invention, in the case of a rate increase, the adjustment of the bandwidth allocation may require adjustment of bandwidth allocation for other

links adjacent to nodes A and B. Thus, according to embodiments of the invention, a notification is sent to the affected neighboring nodes. (see Specification at paragraph 0057, step 6). Thus, in embodiments of the invention, the notification is targeted toward neighbor nodes, rather than all of the nodes of the network.

Accordingly, Applicants respectfully submit that Galand fails to disclose, or suggest, "*notifying neighbor nodes in the network of the mutually-agreed upon optimal bandwidth allocation when reallocation is needed*," as recited in independent claim 1, and similarly recited in independent claims 6-8.

Finally, the Original Office Action took the position that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Kondylis by using the features, as taught by Cousins and Galand, in order to provide efficient use of bandwidth between two nodes, and in order to provide intermediate nodes with essential information regarding bandwidths to be allocated to the particular link. In the Previous Response, inter alia, Applicants persuasively argued that the configurations of Kondylis, Cousins, and Garland have different configurations and applications, such that, a person of ordinary skill in the art would not be motivated to combine the references as either Cousins or Garland would render Kondylis inoperable for its intended purpose. Specifically, Applicants persuasively argued that the cited reference of Kondylis is directed to wireless networks, whereas the cited references of Cousins and Garland are directed towards wired networks.

In the "Response to Arguments" section of the current Office Action, the Office Action maintained its position that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Kondylis by using the features, as taught by Cousins and Galand. Specifically, the Office Action took the position that "[a]lthough, Cousins and Galand are more concerned with wired local networks than wireless local networks, it would still be obvious for one of the ordinary skill in the art at the time of the invention to modify a wireless ad-hoc network, as taught in Kondylis's invention, using features as taught by Cousins and Galand, in order to solidfy the bandwidth sharing implementation. ... Although the implementation of a wireless network is more complicated due to wireless link interference, the idea of managing available bandwidth resource [sic] is still the same." (see Office Action at pages 2-3).

Applicants respectfully submit that the Office Action has failed to establish a prima facie case of obviousness, in light of the operational, functional, and structural differences between the cited references of Kondylis, Cousins, and Galand, articulated by Applicants. The Supreme Court has stated that "rejections on obviousness cannot be sustained by mere conclusory statements; instead there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." (*KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, 82 USPQ2d 1385 (2007); see also MPEP § 2141).

Instead of any articulated reasoning, with a rational underpinning, the Office Action merely makes the conclusory statement that the idea of managing available bandwidth resource is the same for wired networks and wireless networks. The Office Action fails to provide any concrete or convincing arguments as to how exactly the cited references of Cousins and Galand can be incorporated to Kondylis and yield the present application. Specifically, the Office Action does not provide any concrete or specific way to adapt the single-link wired network approach of Cousins and Galand to multi-link wireless ad hoc networks.

Furthermore, Applicants respectfully disagree with the Office Action's assertion that the idea of managing available bandwidth is the same for wired networks and wireless networks. Applicants respectfully submit that one of ordinary skill in the art would readily understand that resource allocation in wired networks is very different than resource allocation in wireless ad hoc networks, and different mechanisms are needed to realize it.

Thus, Applicants respectfully submit that one of ordinary skill in the art would not be motivated to combine the cited references of Kondylis, Cousins, and Galand, and accordingly, the Office Action has failed to establish a prima facie case that independent claims 1 and 6-8 are obvious in light of the cited references.

Therefore, for at least the reasons discussed above, the combination of Kondylis, Cousins, and Galand fails to disclose, teach, or suggest, all of the elements of

independent claims 1 and 6-8. For the reasons stated above, Applicants respectfully request that this rejection be withdrawn.

Claims 2 and 4-5 depend upon independent claim 1. Thus, Applicants respectfully submit that claims 2 and 4-5 should be allowed for at least their dependence upon independent claim 1, and for the specific elements recited therein.

The Office Action rejected claim 3 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Kondylis, in view of Cousins and Galand, and further in view of Counterman (U.S. Patent No. 6,724,727) ("Counterman"). The Office Action took the position that the combination of Kondylis, Cousins, and Galand discloses all the elements of the claim with the exception of certain elements. The Office Action then cited Counterman as allegedly curing the deficiencies of Kondylis, Cousins, and Galand. The rejection is respectfully traversed for at least the following reasons.

The descriptions of Kondylis, Cousins, and Galand, as discussed above, are incorporated herein. Counterman generally describes a method and apparatus for a communications system that prioritizes packets that are transmitted over a digital communication channel utilizing at least one error-correcting transmission path associated with a Quality of Service (QoS) objective. The QoS objective is used to select the appropriate transmission path (that may include forward error coding, scrambling, and interleaving) that satisfies the relevant metrics of the desired level of service quality such as packet latency, variation of the packet latency, information throughput, and packet error rate (PER). The communications system selects a transmission path that is

associated with QoS objectives best matched to the QoS objectives as required by the originating application. (see Counterman at Abstract).

The Original Office Action correctly concluded that the cited references of Kondylis, Cousins, and Galand fail to disclose, or suggest, "*wherein the determining step comprises determining, in the first node, the first new bandwidth allocation that approaches at least one of a Max Min Fair condition and a Quality of Service guarantee condition,*" as recited in claim 3. The Original Office Action alleged that Counterman cured the deficiencies of Kondylis, Cousins, and Galand. In the Previous Response, Applicants persuasively argued, inter alia, that Counterman fails to disclose, or suggest, "*a method of allocating bandwidth in a first node that is operable in an ad hoc, wireless network configured to support at least one guaranteed feasible flow allocation, the method comprising the steps of: initiating a communication between the first node and a second node in the network that, together, are endpoints of a link, the communication being related to possible bandwidth allocation adjustment of a flow sharing the link,*" as recited in independent claim 1 because Counterman simply refers to forward error correction in packet networks, as opposed to transmission scheduling and bandwidth allocation in wireless ad hoc networks, and because, Counterman simply refers to QoS objectives on a single link, which has no bearing in the features recited in independent claim 1.

In the "Response to Arguments" section of the current Office Action, the Office Action alleged that Counterman teaches that its system allocates bandwidth in order to satisfy the QoS objectives as recited in the passage in Column 1, lines 60-67. (see Office

Action at pages 3-4). Applicants respectfully submit that while Counterman may include the expression "bandwidth allocation for QoS objective, one of ordinary skill in the art would readily understand that are several systems for which you can "allocate bandwidth," but the ways to do it differ from system to system. Furthermore, Applicants respectfully submit that embodiments of the invention, may not only realize QoS objectively, but also may realize fairness objectives in wireless ad hoc networks, a concept not disclosed in Counterman.

Furthermore, claim 3 depends upon independent claim 1, respectively. As discussed above, the combination of Kondylis, Cousins, and Galand does not disclose, teach, or suggest all of the elements of independent claim 1. Furthermore, Counterman does not cure the deficiencies in Kondylis, Cousins, and Galand, as Counterman also does not disclose, teach, or suggest, at least, "*an adhoc, wireless network configured to support at least one guaranteed feasible flow allocation*," "*initiating a communication between the first node and a second node in the network that, together, are endpoints of a link, the communication being related to possible bandwidth allocation adjustment of a flow sharing the link*," and "*notifying neighbor nodes in the network of the mutually-agreed upon optimal bandwidth allocation when reallocation is needed*," as recited in independent claim 1, and similarly recited in independent claims 6-8. Thus, the combination of Kondylis, Cousins, Galand, and Counterman does not disclose, teach, or suggest all of the elements of claim 3. Additionally, claim 3 should be allowed for at

least its dependence upon independent claim 1, and for the specific elements recited therein.

For at least the reasons discussed above, Applicants respectfully submit that the cited prior art references fails to disclose or suggest all of the elements of the claimed invention. These distinctions are more than sufficient to render the claimed invention unanticipated and unobvious. It is therefore respectfully requested that all of claims 1-8 be allowed, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned representative at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,

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Enclosures: Notice of Appeal
Petition for Extension of Time
Check No. 019181